

REMARKS

Claims 1-42 were pending in the application. Claims 1-42 stand rejected. Claims 1-2, 8-10, 12-13, 21-23, 29-31, 33-34, and 42 were amended. Claims 1-42 remain in the application.

Claims 1 and 22 were objected to and have been amended as suggested.

Claims 1-2, 6-11, 17, 19-23, 27-32, 38 and 40-42 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bantum (US 6,466,209) in view of Wang et al (US 5,337,361). The rejection states:

"Re claims 1-2, 6-11, 17, 19-23, 27-32, 38 and 40-42:

Bantum discloses a visible image having a plurality of image pixels (col. 2, line 66 through col. 3, line 30); invisible information having a plurality of invisible data elements, each of the invisible data elements relating to and being in registration with a corresponding one of the image pixels of the visible image (col. 3, line 54 through col. 4, line 48 and col. 6, lines 49-67); the visible image is a pictorial image (figs. 1-2); the invisible information is recorded as a pattern of invisible ink deposited by an inkjet printer (col. 6, lines 45+); the invisible image is a classification, identification, categorization, etc. (col. 8, lines 15-60).

"Bantum is silent with respect to recording the visible image and the invisible data on a support/medium, the invisible is detectable in the ultraviolet region of the electromagnetic spectrum and the article contains a temporal sequence of images, respectively.

"Wang et al teaches (figs. 1A-1D; col. 3, line 50 through col. 5, line 38) an image bearing article, comprising: a support 16; a visible image 1, which can be a graphic/computer generated image or a photograph, recorded on the support 16 (fig. 1; col. 3, line 52+); and invisible information 18 recorded on the support 16, the invisible information 18 relating to and in registration with elements of the visible image 17; wherein the invisible information 18 is detectable in the ultraviolet region of the spectrum (col. 3, lines 67+); wherein the article contains a temporal sequence of images (col. 5, lines 35+).

"It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to incorporate the teachings

of Wang et al into the system as taught by Bantum in order to provide Bantum with an alternative storage for storing data (i.e., hard copy). Furthermore, such modification would provide Bantum with a more secure system wherein an authorized individual cannot read or decode the invisible information from the medium/article without necessary equipment (i.e., ultraviolet), and therefore an obvious expedient."

Claim 1 states:

1. An image bearing article, comprising:
 - a) a support;
 - b) a visible image recorded on the support, the visible image having a plurality of image pixels; and
 - c) invisible information recorded on the support, the invisible information having invisible data elements corresponding to each of said image pixels of said visible image, each of said invisible data elements relating to and being in registration with a respective one of the image pixels of the visible image.

Claim 1 is supported by the application as filed, notably, the original claims, page 4, lines 25-31, page 4, lines 9-12, and Figure 1.

Claim 1 requires that the invisible data elements correspond to each of the pixels of the visible image and are each in registration with a respective image pixel. In Bantum, the additional data is stored only in a part of the image. (region with fixed or limited range pixel values - Bantum, col. 1, lines 61-64; region with random-like distribution of pixel values - Bantum, col. 2, lines 5-8). Bantum states:

'If a region tests "random" or "constant" the process terminates successfully, i.e., that region is selected for data hiding. Otherwise the next candidate region is checked. If no random or constant region is found among the candidates, the process fails. The minimum intensity value in the region is also returned. Note that all candidate regions could be checked for the region that is the "most" random or constant according to the above described process, although this would increase process complexity accordingly.' (Bantum, col. 3, lines 39-47)

Wang teaches use of invisible information that overlaps a visible image. Applicants have found nothing in Wang that meets the requirement of Claim 1 that invisible data elements correspond to each of the pixels of the visible image and are each in registration with a respective image pixel. Various features disclosed in Wang are incompatible with the claimed invention. For example, a partial overlap is shown in Figure 1A. Barcodes are used as invisible information. (Wang, Figure 1A; col. 9, lines 38-44) These features are incompatible with the requirement of Claim 1 that each invisible data element corresponds to and is in registration with a respective image pixel.

A combination of the Bantum and Wang would teach no more, than each reference individually.

Bantum also contradicts the motivation proposed in the rejection, for combining Wang with Bantum. The rejection indicates a first motivation:

"in order to provide Bantum with an alternative storage for storing data (i.e., hard copy)." (first full paragraph, page 4)

This position assumes that Bantum does not teach or suggest hard copy, since there would be no motivation for combining Bantum with Wang to provide a feature already present in Bantum. Bantum does teach printing of the images bearing the disclosed markings:

"Unique identification markers can be quickly imprinted on images such as documents without damage to the information content of the image, and without detection." (Bantum, col. 8, lines 37-39; emphasis added)

The rejection also assumes that one of skill in the art would look to Wang for "alternative storage for storing data (i.e., hard copy)". Wang teaches the use of UV-detectable invisible information, which would be unnecessary to the use of Bantum in relation to hard copy. Bantum is or is similar to steganographic data storage. (See the references cited in Bantum; for example, U.S. Patent No. 5,687,236, entitled "Steganographic Method and Device". Also see Rhoads, U.S. 6,252,963, which was cited in the office action.) It is well known that steganography is applicable to both digital images and printed images. (See Rhoads, abstract and col. 76, line 41 to col. 78, line 2) Steganography does not require UV-detectable invisible information. Why would one of skill in the art add the complication of using UV-detectable invisible information? Bantum does not need to use "invisible ink".

The rejection argues:

"Bantum discloses ... the invisible information if recorded as a pattern of invisible ink deposited by an inkjet printer (col. 6, lines 45+)" (office action, third paragraph, page 3)

Applicants can find no mention of an inkjet printer or invisible ink at the cited portion of Bantum or elsewhere in Bantum. The term "invisible inking" in Bantum does not relate to invisible ink:

"Invisible inking relies on human visual insensitivity to fine differences in intensity to store data transparently within image confines." (Bantum, col. 7, lines 27-31)

"It is believed that an invisible inking process can be simply implemented utilizing known image processing techniques." (Bantum, col. 7, lines 45-47)

This leads to the rejection's second proposed motivation for combining Wang with Bantum. The rejection argues:

"Furthermore, such modification would provide Bantum with a more secure system wherein an authorized individual cannot read or decode the invisible information from the medium/article without necessary equipment (i.e., ultraviolet), and therefore an obvious expedient."

This assumes that Bantum modified by Wang would be more secure than Bantum alone. The use of invisible information that is read in ultraviolet light provides security from casual observation, but no more. For this reason, such invisible information is commonly used in toys and games and readers that emit ultraviolet or infrared radiation are widely available. (See, for example, U.S. Patent No. 5,959,281)

Bantum, in contrast, states:

"Unique identification markers can be quickly imprinted on images such as documents without damage to the information content of the image, and without detection. Without further processing, these identification markers are difficult or impossible to detect without knowledge of the methodologies used, or an original of the image." (Bantum, col. 8, lines 37-42; emphasis added)

Making the identification markers visible in ultraviolet light would allow easy detection using simple equipment and would degrade the security provided by

Bantum. One of skill in the art would, therefore, not modify Bantum with Wang, as proposed in the rejection.

The rejection has also not addressed what would lead one of skill in the art to combine Bantum and Wang in the specific manner described in the rejection. Bantum and Wang could be combined in other ways. The simplest would be to use both Bantum and Wang, without modifying either. That would add the security of Wang, without putting the security of Bantum at risk. Modifications are necessarily more risky and complicated than using a disclosure as taught by a reference. In any case, such combinations would not teach or suggest more than either reference by itself.

Claim 2 states:

2. An image bearing article, comprising:
 - a) a support;
 - b) a visible image recorded on the support, the visible image having a plurality of image pixels; and
 - c) invisible information recorded on the support, the invisible information having invisible data elements corresponding to each of said image pixels of said visible image, each of said invisible data elements relating to and being in the same physical pixel location as a respective one of the image pixels of the visible image;
- wherein the visible image is a pictorial image.

Claim 2 is supported by the application as filed in the same manner as Claim 1.

Claim 2 requires that the invisible information has invisible data elements corresponding to each of the image pixels of the visible image and that each of the invisible data elements relate to and are in the same physical pixel location as a respective image pixel of the visible image. Bantum teaches against this feature, in that Bantum localizes data to a particular region in the image and modifies pixels in that region to carry the information, rather than providing additional information relating to those pixels. (See Bantum, abstract, Figures 2-3, and the above discussion of Claim 1.) As to Wang and the combination of Bantum and Wang, see the discussion of Claim 1.

Claims 6-7 and 21 are allowable as depending from Claim 2.

Claims 8-11, 17, and 19-20 are allowable as depending from Claim 1 and as follows.

Claims 8-10 state:

8. The article claimed in Claim 1, wherein the invisible data elements are each distance information relating to a respective one of the image pixels.

9. The article claimed in Claim 1, wherein the invisible data elements are each a classification of a respective one of the image pixels.

10. The article claimed in Claim 1, wherein the invisible data elements are each a difference between a respective one of the image pixels and a corresponding element in a separate image.

Claims 8-10 require that the invisible data elements are distance information, a classification, and a difference, respectively, relating to a respective image pixel. The portion of Bantum apparently cited in regard to Claims 8-10 (Bantum, col. 8, lines 15-60) merely discloses "Possible Applications" of the earlier discussed method, which as discussed above in relation to Claim 1 does not teach or suggest the claimed invention, either by itself or with Wang. The rejection does not address how the cited combination of references would be capable of carrying information about each pixel while, according to Bantum, only modifying pixels in a particular region of the image.

Claim 11 is also allowable as depending from Claim 10.

Claim 21 is allowable as depending from Claim 2.

Claims 22 and 23 are supported and allowable on the same basis as Claims 1 and 2, respectively.

Claims 27-28 and 42 are allowable as depending from Claim 23.

Claims 29-32, 38, and 40-41 are allowable as depending from Claim 22 and as follows.

Claims 29-32 are allowable on the grounds discussed above in relation to Claims 8-11.

Claims 3-5, 12, 18, 24-26, 33 and 39 stand rejected under 35 U.S.C 103(a) as being unpatentable over Bantum as modified by Wang et al as applied to claims 1 and 22, and further in view of Williams et al (US 6,610,386).

Claims 3-5 are allowable as depending from Claim 2 and on the grounds discussed above in relation to the combination of Bantum and Wang.

Claims 12 and 18 are allowable as depending from Claim 1. Claim 12 is also allowable on the grounds discussed above in relation to Claims 8-10.

Claims 24-26 are allowable as depending from Claim 23.

Claims 33 and 39 are allowable as depending from Claim 22. Claim 33 is also allowable on the grounds discussed above in relation to Claims 8-10.

Claims 13-16 and 34-37 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bantum as modified by Wang et al as applied to claims 1 and 22, and further in view of Rhoads US 6,252,963).

Claims 13-16 and 34-37 are allowable as depending from Claims 1 and 22, respectively, and on the grounds discussed above in relation to Claims 8-10.

It is believed that these changes now make the claims clear and definite and, if there are any problems with these changes, Applicants' attorney would appreciate a telephone call.

In view of the foregoing, it is believed none of the references, taken singly or in combination, disclose the claimed invention. Accordingly, this application is believed to be in condition for allowance, the notice of which is respectfully requested.

Respectfully submitted,



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If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.